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ELECTROPHORETIC PROFILE OF SERUM PROTEINS IN DROMEDARY CAMELS

Preeti Choudhary[1], D. Suchitra Sena[1] and Dinesh Chandra[2]
[1]National Research Centre on Camel, Bikaner, Rajasthan, India
[2]Department of Molecular Biology and Biotechnology, MPUAT, Udaipur, Rajasthan, India

ABSTRACT

Electrophoretic pattern of serum protein and dialysed serum protein profiles were studied from apparently healthy camels on 10% and 15% SDS-PAGE in addition to total protein and immunoglobulin content. The electrophoretic pattern of camel serum protein revealed 7 prominent bands of molecular weights ranging from 28.21 kDa to 123.07 kDa on 10% SDS-PAGE and dialysed serum protein revealed 4 prominent bands of molecular weights ranging from 24.30 kDa to 110.87 kDa. The electrophoretic pattern of camel serum protein on 15% SDS PAGE revealed 8 prominent bands of molecular weights ranging from 0.005 to 121.04 kDa along with 5 bands of dialysed serum protein. There are about 7 lower molecular weight bands which may be of prealbumin and other lower molecular weight proteins. The lower molecular weight bands may be of pre albumin. The band with higher molecular weight may be of different globulin fractions including immunoglobulins. Total protein and immunoglobulin content were low in present study possibly due to very hot temperature and limited grazing facility during summer.

Key words: Dromedary camels, electrophoretic pattern, immunoglobulin SDS-PAGE, serum protein

Much of the research has been carried out on the blood chemistry of the camel has taken place in India, Egypt and Sudan, and to a lesser extent in Israel. Unfortunately, many of the results appear to be contradictory, the anomalies perhaps arising from different methods of analysis and the difficulties of reproducing the same conditions in exactly the same way. Some of the differences can be explained by seasonal and nutritional factors and by the effects of sex and the rut but many anomalies are unexplained (Al-Busadah, 2007). The present study was designed to investigate serum protein and dialysed serum protein profile of dromedary camels on 10% and 15% SDS-PAGE in addition to some blood parameters, i.e. total protein and immunoglobulin.

Materials and Methods

The serum was obtained from three apparently healthy dromedary camels maintained at the National Research Centre on Camel, Bikaner. The blood was collected from jugular vein and later serum was separated. The serum samples were also dialysed for about 4 hr against 0.067M sodium phosphate buffer, pH 7.4. The serum and dialysed serum samples were subjected to SDS- PAGE using 10 and 15% separating gel concentrations as per Laemmli (1970). For the standard, protein marker (19.4 to 94kDa) was also electrophoresed along. The mobility of the respective bands of different lanes was calculated as per standard method (Weber and Osborn, 1969). The total protein in serum samples was estimated spectrophotometrically (UV-Vis Spectrophotometer) using commercial kit (Merck, India). Serum immunoglobulins was estimated by modified zinc sulphate turbidity test (Bgvv/GTZ, 1994).

Results and Discussion

In present study electrophoresis of three serum samples collected from apparently healthy dams on 10% SDS-PAGE revealed seven prominent bands with molecular weights ranging from 28.21 kDa to 123.07 kDa. The molecular weight equal to 63.7 kDa may be of serum albumin. Nazifi *et al* (2001) suggested that the most obvious protein of camel serum was of molecular weight 63 kDa. The higher molecular weight of 123.07 kDa may be of immunoglobulins (Table 1). Globulins was not depicted clear in fractionation of serum sample since it requires a gradient gel electrophoresis and further purification of the serum. The molecular weights up to around 28 kDa were noticed in 10% SDS PAGE. Whereas, in the dialysed samples a prominent band from 110.87 to 84.40 kDa was seen which may be of immunoglobulins (Table 2). There were also faint bands of molecular weights around 24 kDa. A total of 8 prominent bands with molecular

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weights ranging from 0.005 kDa to 121.04 kDa were noticed in the camel serum protein which was run on 15% SDS- PAGE (Table 1). Five bands with molecular weights ranged between 0.009 to 108.87 KDa were observed and the higher molecular weight may be of immunoglobulins and 5 bands (Table 2). Ungar *et al* (1987) mentioned that camel serum contains a complex Ig G- like protein associated with an additional molecule of approximately 100 kDa. Upon reduction of the disulfide bonds the complex dissociates into 3 protein bands corresponding to γ and L- like chains and a protein band has an average molecular weight of about 40 KDa which is specific for dromedary species. The molecular weights below 20 kDa which were not noticed in 10% SDS-PAGE, were observed in 15% SDS-PAGE. There are about 7 bands, which are the low molecular weight proteins.

Total protein was in range of other results reported earlier (Patodkar *et al,* 2010; El- Bahrawy and El Hassanein, 2011) for all the serum samples the total protein was estimated between 6.7 to 7.2 g/dl and the immunoglobulin content revealed 16 to 18 mg/ml. Roy and Sharma (1991) reported that Ig levels in adult female camels above 3 years of age with suckling calves up to one month of age was 26.62± 2.91 mg/ml (Mean± SE). Kataria and Kataria (2004) observed a mean Ig content of 2.43 and 2.86 g/dl in dromedary camels in moderate and hot climates, respectively. Sena *et al* (2011) conducted a clinical trial to study the effect of herbal immunomodulator during summer stress among 10 camel calves of 5-6 months age and suggested that the reduction in bodyweight and immunoglobulin might be due to stressful hot climate in summers.

Table 1. Mobility with their respective molecular weights of serum protein samples on 10% and 15% SDS-PAGE.

Band	On 10% SDS-PAGE		On 15% SDS-PAGE	
	Mobility	Molecular weight (kDa)	Mobility	Molecular weight (kDa)
1.	0.09	123.07	0.05	121.04
2.	0.13	116.29	0.46	20.46
3.	0.2	105.48	0.48	19.26
4.	0.33	84.40	0.53	15.67
5.	0.46	63.70	0.56	13.28
6.	0.63	43.27	0.60	10.92
7.	0.78	28.21	0.66	6.41
8.	–	–	0.78	0.005

Table 2. Mobility with their respective molecular weights of dialysed serum protein samples on 10% and 15% SDS-PAGE.

Band	On 10% SDS-PAGE		On 15% SDS-PAGE	
	Mobility	Molecular weight (kDa)	Mobility	Molecular weight (kDa)
1.	0.16	110.87	0.14	108.87
2.	0.33	84.40	0.33	84.40
3.	0.56	51.33	0.56	13.28
4.	0.83	24.30	0.60	10.92
5.	–	–	0.72	0.009

Electrophoretic pattern of serum proteins in camel has been investigated earlier by some workers (Khadjeh, 1998; Nazifi *et al*, 2001; El-Bahrawy and El Hassanein, 2011). Khadjeh (1998) studied electrophoretic pattern of serum proteins in the Iranian one humped camel by cellulose acetate electrophoresis which revealed five protein bands *viz*, albumin, α_1, α_2, β, and γ globulins. Purohit *et al* (1981) conducted agar gel electrophoresis of camel serum and revealed 6 protein bands *viz*, albumin, α_1, α_2, β, γ_1, γ_2 globulins.

In conclusion, difference were observed in electrophoretic patterns of serum and dialysed serum on two different gel concentration because of difference in molecular mass and restrain resulted due to concentration of gel. Immunoglobulin content observed low in present study suggested that it may be due to very hot temperature and limited grazing facility during summer.

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